

【特許請求の範囲】

【請求項1】半導体チップの表面に半導体チップと略同一サイズのリードフレームを重ね合わせて接着剤を介して貼り付け、リードフレームのインナリードと半導体チップとをボンディングワイヤで接続し、アウトリードの表面と面一となるように半導体チップの表面側をモールド樹脂で封止して、封止樹脂表面にアウトリードの表面を露出させた半導体装置において、インナリードに接続されるボンディングワイヤがアウトリードの表面を越えないように、インナリードの表面側の厚みを減らしてインナリード表面をアウトリード表面より一段低くしたことを特徴とする半導体装置。

【請求項2】上記リードフレームのサイズを半導体チップよりやや大きめに形成し、該リードフレームを半導体チップの表面に重ね合わせたとき形成される端面間のギャップもモールド樹脂で封止するようにした請求項1に記載の半導体装置。

【請求項3】上記半導体チップの表面にリードフレームを貼り付ける接着剤を、インナリード側のみならずアウトリード側にも介在させた請求項1または2に記載の半導体装置。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明はリードフレームを使用した半導体装置に係り、特にチップサイズと略同一のサイズをもつ薄型かつ小型の半導体パッケージ構造に関するものである。

【0002】

【従来の技術】大容量のDRAM（Dynamic Random Access Memory）では、高密度実装の要求に対応して、比較的小さなパッケージに大形化した半導体チップを収納できるLOC（Lead On Chip）構造が採用されているが、容量の増加により更にチップサイズレベルにまで小形化されたパッケージが要求されるようになってきた。また、電子機器用の半導体パッケージも、パソコン、ファックス、パーソナル電話機、ICカード等のサイズの縮小に伴って、より小形化することが要求されている。しかも、この小形化は、単にパッケージの専有する面積にのみ求められるのではなく、パッケージの厚さ方向にも求められている。

【0003】従来、これらの要請に応えるものとして、リードの一部のみをパッケージの底面に露出させたCSP（Chip Scale Package）と呼ばれる半導体装置が提案されている（特開平6-132453号公報）。具体的には、図7に示すように、半導体チップ21の配線面（表面）21aに半導体チップ21と同一サイズのリードフレーム22を端面を合わせて接着剤23で貼り付ける。リードフレーム22のインナリード22aと半導体チップ21とをボンディングワイヤ24で接続した後、モールド樹脂25で封止する際、半導体チップ21の表

面側をモールド樹脂25で封止して、モールド樹脂25の表面25aにアウトリード22bの表面22cを露出させたものである。

【0004】ここに、インナリード22aと半導体チップ21とを接続するボンディングワイヤ24が、アウトリード22bの表面22cと面一にしたモールド樹脂25の表面25aからはみださないように、リードに段差を設ける必要があるが、この従来例では、リードフレーム22をダウンセット加工することによって、インナリード22aをアウトリード22bよりも一段低くしている。

【0005】

【発明が解決しようとする課題】上述した従来技術によって、パッケージの小形化は、パッケージの専有する面積に反映されるばかりでなく、パッケージの厚さ方向にも反映されるようになってきた。しかし、リードフレームをダウンセット加工することによってリードに段差を設けるようにしているので、リード厚を超えた加工深さが必要となり、その分、パッケージ厚さを薄くできない。

【0006】また、パッケージのサイズが半導体チップ1と同一であると、最小のパッケージを得ることができるが、半導体チップ1の大きさのばらつきによっては、モールド樹脂封止時にモールド金型が半導体チップ1の一部を破損してしまうおそれがある。

【0007】さらに、半導体チップへのリードフレームの接着固定は、インナリード側のみで行なっているため、モールド樹脂封止の際に、アウトリード側の厚み方向での固定が十分でない場合が生じるが、固定が十分でないと、アウトリードの表面にモールド樹脂が薄く回り込み、表面を削り出す必要があった。

【0008】本発明の目的は、上述した従来技術の問題点を解消して、パッケージ厚さをより薄くできる半導体装置を提供することにある。また、本発明の目的は、モールド樹脂封止時、半導体チップが破損しない半導体装置を提供することにある。さらに、本発明の目的は、モールド樹脂封止後、アウトリード表面の削り出しを必要としない半導体装置を提供することにある。

【0009】

【課題を解決するための手段】本発明の半導体装置は、半導体チップの表面に半導体チップと略同一サイズのリードフレームを重ね合わせて接着剤を介して貼り付け、リードフレームのインナリードと半導体チップとをボンディングワイヤで接続し、アウトリードの表面と面一となるように半導体チップの表面側をモールド樹脂で封止して、封止樹脂表面にアウトリードの表面を露出させた半導体装置において、インナリードに接続されるボンディングワイヤがアウトリードの表面を越えないように、インナリードの表面側の厚みを減らしてインナリード表面をアウトリード表面より一段低くしたものである。こ

のようにインナリードの厚みをアウタリードよりも減らしてインナリードをアウタリードより一段低くできるようにすると、リードをダウンセットする場合に比して、パッケージ厚さをより薄くすることができる。

〔 0 0 1 0 〕 また、このような本発明の半導体装置において、リードフレームのサイズを半導体チップよりやや大きめに形成し、リードフレームを半導体チップの表面に重ね合わせたとき形成される端面間のギャップもモールド樹脂で封止することが、半導体チップの破損を有効に防止できる。また、半導体チップの表面にリードフレームを貼り付ける接着剤を、インナリード側のみならずアウタリード側にも介在させることが、アウタリードの表面へのモールド樹脂の回り込みを防止できる。

〔 0 0 1 1 〕

〔 発明の実施の形態 〕 以下に本発明の半導体装置の実施の形態を図面を用いて詳細に説明する。図 1 は、半導体チップ 1 上に同一サイズのリードフレーム 4 を載せた C S P 構造の断面図である。

〔 0 0 1 2 〕 半導体チップ 1 は、その配線面である表面 1 a の中央近傍にボンディングパッド 2 が配設されて構成される。この半導体チップ 1 の表面 1 a に貼り付けられるリードフレーム 4 は、半導体チップ 1 と同一サイズで構成され、半導体チップ 1 と接続するためのインナリード 4 a と、外部端子となるアウタリード 4 b とを有する。半導体チップ 1 とリードフレーム 4 との貼付けは、半導体チップ 1 の端面 1 c とリードフレーム 4 の端面 4 d とが一致するように、半導体チップ 1 とリードフレーム 4 とを重ね合わせて、両面接着剤付テープ 3 を介して行う。

〔 0 0 1 3 〕 リードフレーム 4 は折曲していない代りに、一部の厚さを減らして薄くしてある。すなわち、リードフレーム 4 のインナリード 4 a は、その貼付け面と反対面（表面 4 e）側をコイニングしてアウタリード 4 b よりも薄くしたコイニング部 5 を形成し、インナリード 4 a と半導体チップ 1 のボンディングパッド 2 とを接続するボンディングワイヤ 9 の高さをアウタリード 4 b の貼付け面と反対面（表面 4 c）よりも低くなるようにしてある。

〔 0 0 1 4 〕 このようにして厚さを減らしてアウタリード 4 b の表面 4 c よりも一段低くしたインナリード 4 a のコイニング部 5 には鉗めつき 6 が施され、鉗めつき 6 が施されたコイニング部 5 と半導体チップ 1 の中央近傍に配されたボンディングパッド 2 とがボンディングワイヤ 9 によって接続される。コイニング部 5 が一段低くなっているため、ボンディングワイヤ 9 の高さは、アウタリード 4 b の表面 4 c より低く抑えることができる。

〔 0 0 1 5 〕 モールド樹脂 8 による封止は、半導体チップ 1 の表面 1 a 側で行なわれる。モールド樹脂 8 の厚さを、アウタリード 4 b の表面 4 c と同一高さにして、インナリード 4 a およびボンディングワイヤ 9 などをモ-

ールド樹脂 8 中に埋めて保護するが、アウタリード 4 b の表面 4 c は封止樹脂表面 8 a に露出させる。このとき、パッケージの面積を小さく、かつパッケージの厚さを薄くするために、モールド樹脂 8 は、リードフレーム 4 の端面 4 d 及び半導体チップ 1 の端面 1 c 及び半導体チップ 1 の裏面 1 b に回りこまないようにする。

〔 0 0 1 6 〕 このように構成された半導体パッケージは、コイニングによってリードに段差を設けているため、従来のようにリードフレームをダウンセットする必要はない。また、パッケージ厚さは半導体チップ厚、両面接着剤付テープ厚、及び 1 枚のリード厚を合計した厚さとなり、ダウンセットが要求するリード厚の 2 倍以上の加工深さがリード部分に要求されないため、パッケージの厚さをより薄くすることができる。

〔 0 0 1 7 〕 上述した半導体パッケージを製造するには、まず、モールド樹脂 8 の端面 8 b を半導体チップ 1 の端面 1 c に一致させるために、パッケージに使用されるリードフレーム 4 は、その樹脂ダムバー 1 7 の位置を、図 2 に示すように、一点鎖線で示した半導体チップ 1 の外周に沿って配置するように構成する。また、パッケージ製造時に使用するモールド金型は、半導体チップ 1 の外形とほぼ同じ大きさとし、半導体チップ 1 の裏面 1 b 側にモールド樹脂 8 が回らないようにして、半導体チップの表面側のみをモールドする。なお、リードフレーム 4 の端面 4 d は樹脂ダムバー 1 7 の切断面となる。

〔 0 0 1 8 〕 モールド後、樹脂ダムバー 1 7 を金型で切断し、リード 4 a、4 b を個々に切り離す。ここで、樹脂ダムバー 1 7 を切断する前に、モールド樹脂 8 の表面 8 a に露出するアウタリード 4 b の表面 4 c に、半田との濡れが良好な鉗めつき 7 をインナリード 4 a のコイニング部 5 の鉗めつき 6 と同時に行っておくのがよい。こうするとアウタリード 4 b の表面の外装半田めつきは不要となり、コスト低減できるとともに、モールド後、パッケージにダメージを与える工程を減らすことができる点でも有利である。

〔 0 0 1 9 〕 本製造方法によれば、従来より行われている L O C リードフレームの製造工程、および樹脂モールド工程をそのまま、または、一部省略して利用することができるため、従来のモールドパッケージと比較して価格的に同等でありながら、より小型かつ薄型のパッケージを得ることができる。

〔 0 0 2 0 〕 ところで、図 1 に示すパッケージ構造のモールド領域では、パッケージのサイズが半導体チップ 1 と同一であるため、半導体チップ 1 の大きさのばらつきによっては、モールド金型が半導体チップ 1 の一部を破損してしまうことが懸念される。このような懸念は、図 3 に示すように、半導体チップ 1 に対してモールド領域を若干拡大する設定を行うことによって解消できる。すなわち、リードフレーム 4 のサイズを半導体チップ 1 よりやや大きめに形成し、このやや大きめに形成したリード

Japanese Patent Laid-Open Publication No. Heisei 9-92775

[TITLE OF THE INVENTION]

Semiconductor Device

5

[CLAIMS]

1. A semiconductor device including a semiconductor chip, a lead frame having a size substantially equal to that of the semiconductor chip, the lead frame being bonded to a surface of the semiconductor chip by an adhesive layer interposed therebetween under the condition in which the lead frame is overlapped with the semiconductor chip, bonding wires adapted to bond inner leads included in the lead frame to the semiconductor chip, and a resin encapsulate adapted to encapsulate a region toward the surface of the semiconductor chip in such a fashion that it has a surface flush with a surface of each of outer leads included in the lead frame to expose the surface of the outer lead at the surface of the resin encapsulate, wherein each of the inner leads has a reduced thickness at a surface thereof in such a fashion that the bonding wire connected to the inner lead does not extend beyond the surface of an associated one of the outer leads, whereby the surface of the inner lead is lower than the surface of the outer lead by one step.

2. The semiconductor device in accordance with claim 1, wherein the size of the lead frame is slightly larger than that of the semiconductor chip, and the resin encapsulate fills a gap defined between corresponding end surfaces of the semiconductor chip and the lead frame when the lead frame is laid on the surface of the semiconductor chip in an overlapped state.

3. The semiconductor device in accordance with claim 1 or 2, wherein the adhesive layer is disposed not only at a region where the inner leads are arranged, but also at a region where the outer leads are arranged.

[DETAILED DESCRIPTION OF THE INVENTION]
[FIELD OF THE INVENTION]

The present invention relates to a semiconductor device using a lead frame, and more particularly to a semiconductor package having a thin and compact structure substantially equal in size to a semiconductor chip packaged therein.

[DESCRIPTION OF THE PRIOR ART]

In DRAMs (Dynamic Random Access Memories) having a large capacity, an LOC (Lead On Chip) structure is mainly

used which is capable of allowing a semiconductor chip having a large size to be packaged in a relatively small package, in order to meet a requirement of high-density mounting. However, the recent demand of an increased capacity has resulted in a requirement of compact semiconductor packages having a size reduced to a chip size level. Similarly, semiconductor packages for electronic appliances such as facsimile machines, personal computers, IC cards, and the like has been required to have a more compact structure in pace with the recent trend of those electronic appliances toward a compactness. Furthermore, such a compactness of a semiconductor package have been required with regard to not only the area occupied by the semiconductor package, but also the thickness of the semiconductor package.

In order to meet such requirements, a semiconductor device has been proposed which is called a "CSP (Chip Scale Package)" (Japanese Patent Laid-open Publication No. Heisei 6-132453). In such a CSP package, each lead is partially exposed at the lower surface of the package. Referring to Fig. 7 illustrating a detailed structure of this CSP package, a lead frame 22 having the same size as that of a semiconductor chip 21 is bonded to the wiring surface of the semiconductor chip 21, that is, the surface 21a, in such a fashion that their corresponding edges are aligned

with each other, by means of an adhesive 23. Inner leads 22a of the lead frame 22 are connected to the semiconductor chip 21 by means of bonding wires 24. In this state, an encapsulating process is carried out using a molding resin 25. In this encapsulating process, the semiconductor chip 21 is encapsulated by the molding resin 25 at its portion toward its surface 21a, thereby causing the surface 22c of each outer lead 22b to be exposed at the surface 25a of the molding resin 25.

10 In this case, it is necessary to provide a stepped lead structure in order to prevent the bonding wires 24 serving to connect the inner leads 22a to the semiconductor chip 21 from being protruded from the surface 25a of the resin 25 flush with the surfaces 22c of the outer leads 22b. To this end, in this conventional example, the lead frame 22 is subjected to a down-setting process so that each inner lead 22a is lower than an associated one of the outer leads 22c by one step.

20 [SUBJECT MATTERS TO BE SOLVED BY THE INVENTION]

In accordance with the above mentioned conventional technique, compactness of a semiconductor package can be achieved with regard to not only the area occupied by the semiconductor package, but also the thickness of the semiconductor package. However, since this technique

provides a stepped lead structure by down-setting the lead frame, it requires a machining depth exceeding the lead thickness. For this reason, it is impossible to produce a package having a thickness less than the machining depth.

5 Where the semiconductor chip 1 has the same size as that of a package to be produced, the package may have a minimized size. However, if the semiconductor chip 1 has a non-uniform size, it may be damaged by a mold during an encapsulating process using the molding resin.

10 Furthermore, the lead frame may be in a state insufficiently fixed in a thickness direction at its portion near the outer leads during the encapsulating process because the bonding and fixing of the lead frame to the semiconductor chip is achieved at a portion of the lead
15 frame near the inner leads. As a result, the molding resin may spread in the form of a thin film on the outer lead surface. In this case, it is necessary to shave off the resin film coated on the outer lead surface.

 An object of the invention is to solve the above
20 mentioned problems involved in the prior art, and to provide a semiconductor device having a reduced package thickness. Another object of the invention is to provide a semiconductor device having a structure capable of preventing its semiconductor chip from being damaged during
25 an encapsulating process using a molding resin. Another

object of the invention is to provide a semiconductor device having a structure capable of eliminating a requirement for its outer lead surface to be shaved off after an encapsulating process.

5

[MEANS FOR SOLVING THE SUBJECT MATTERS]

The present invention provides a semiconductor device including a semiconductor chip, a lead frame having a size substantially equal to that of the semiconductor chip, the lead frame being bonded to a surface of the semiconductor chip by an adhesive layer interposed therebetween under the condition in which the lead frame is overlapped with the semiconductor chip, bonding wires adapted to bond inner leads included in the lead frame to the semiconductor chip, and a resin encapsulate adapted to encapsulate a region toward the surface of the semiconductor chip in such a fashion that it has a surface flush with a surface of each of outer leads included in the lead frame to expose the surface of the outer lead at the surface of the resin encapsulate, wherein each of the inner leads has a reduced thickness at a surface thereof in such a fashion that the bonding wire connected to the inner lead does not extend beyond the surface of an associated one of the outer leads, whereby the surface of the inner lead is lower than the surface of the outer lead by one step.

In the semiconductor device of the present invention, the size of the lead frame may be slightly larger than that of the semiconductor chip. In this case, the resin encapsulate fills a gap defined between
5 corresponding end surfaces of the semiconductor chip and the lead frame when the lead frame is laid on the surface of the semiconductor chip in an overlapped state. Accordingly, it is possible to effectively prevent the semiconductor chip from being damaged. The adhesive layer
10 may be disposed not only at a region where the inner leads are arranged, but also at a region where the outer leads are arranged. In this case, it is possible to prevent the molding resin from spreading on the outer lead surface.

15 [PREFERRED EMBODIMENTS OF THE INVENTION]

Hereinafter, preferred embodiments of the present invention will be described in detail in conjunction with the annexed drawings. Fig. 1 is a cross-sectional view illustrating a CSP structure in which a lead frame 4 having
20 the same size of a semiconductor chip 1 is bonded to the semiconductor chip 1.

The semiconductor chip 1 is provided at its wiring surface, namely, a surface 1a, with bonding pads 2. These bonding pads 2 are arranged in the vicinity of the central
25 portion of the surface 1a. The lead frame 4, which is

attached to the surface 1a of the semiconductor chip 1, has the same size as that of the semiconductor chip 1. The lead frame 4 includes inner leads 4a adapted to come into contact with the semiconductor chip 1, and outer leads 4b each serving as an external terminal. The attachment between the semiconductor chip 1 and lead frame 4 is achieved by overlapping the semiconductor chip 1 and lead frame 4 with each other in such a fashion that each end surface 1c of the semiconductor chip 1 is aligned with an associated one of end surfaces 4d of the lead frame 4, and interposing a double-sided adhesive tape 3 between the overlapped semiconductor chip 1 and lead frame 4.

The lead frame 4 has a structure not bent, but having a reduced thickness at a desired portion thereof. That is, each inner lead 4a has a coining portion 5 having a thickness less than that of an associated one of the outer leads 4b. The coining portion 5 is formed by coining a surface of the inner lead 4a opposite to the bonding surface of the inner lead 4a, that is, a surface 4c. Accordingly, bonding wires 9, which connect the inner leads 4a to bonding pads 2 of the semiconductor chip 1 respectively, have a height lower than a surface of each outer lead 4b opposite to the bonding surface of the outer lead 4b, that is, the surface 4c.

For the coining portion 5 of each inner lead 4a

arranged at a level lower than the surface 4c of the associated outer lead 4b by virtue of the above mentioned thickness reduction, a silver plating process is conducted to form a silver plating film 6. The coining portions 5
5 formed with the silver plating films 6 are connected with the bonding pads 2 arranged near the central portion of the semiconductor chip 1 by means of the bonding wires 9, respectively. Since each coining portion 5 is arranged at a level lower than the surface 4c of the associated outer
10 lead 4b by one step, the associated bonding wire 9 can be controlled to have a height lower than the surface 4c of the outer lead 4b.

An encapsulating process using a molding resin is conducted at a region toward the surface 1a of the semiconductor chip 1, thereby forming a resin encapsulate
15 8. The thickness of the resin encapsulate 8 is determined in such a fashion that the resin encapsulate 8 is flush with the surfaces 4c of the outer leads 4b at its surface 8a. The inner leads 4a and bonding wires 9 are
20 encapsulated by the resin encapsulate 8 so that they are protected. The surfaces 4c of the outer leads 4b are exposed at the surface 8a of the resin encapsulate 8. In order to reduce the area of the package while reducing the thickness of the package, the resin encapsulate 8 is
25 prevented from extending beyond each end surface 4d of the

lead frame 4, each end surface 1c of the semiconductor chip 1c, and the surface 1b of the semiconductor chip 1.

5 Since the semiconductor package configured as mentioned above has a stepped lead structure formed using a coining process, it is unnecessary for its lead frame to be down-set. The semiconductor package has a thickness corresponding to the sum of the thickness of the semiconductor chip, the thickness of the double-sided adhesive tape, and the thickness of one lead sheet. The 10 thickness of the semiconductor package can be minimized because the lead portion of the semiconductor package involves no machining depth, corresponding to at least two times the lead thickness, required in a down-set structure.

15 In the fabrication of the above mentioned semiconductor package, the lead frame 4 used to fabricate the semiconductor package is arranged with respect to the semiconductor chip 1 in such a fashion that its resin dam bars 17 extend along the peripheral edges of the semiconductor chip 1 indicated by dotted lines in Fig. 2, 20 so as to align each end surface 8b of the resin encapsulate 8 with the associated end surface 1c of the semiconductor chip 1. The mold used in the fabrication of the semiconductor package has a size substantially equal to the size of the semiconductor chip 1. The resin encapsulate 8 25 is molded only at a region toward the surface 1a of the

semiconductor chip 1 while being prevented from spreading on the surface 1b of the semiconductor chip 1. Each resin dam bar 17 is cut along the associated end surface 4d of the lead frame 4.

5 After molding, the resin dam bars 17 are cut from the mold, thereby achieving a separation of the leads 4a and 4b. It is desirable that, prior to the cutting of the resin dam bars 17, a silver plating film 7 providing a good flowability of solder is formed on the surfaces 4c of the
10 outer leads 4b exposed at the surface 8a of the resin encapsulate 8. The formation of the silver plating film 7 may be conducted simultaneously with the formation of the silver plating film 6 on the coining portions 5 of the inner leads 4a. In this case, it is unnecessary to conduct
15 an external solder plating process for the surfaces of the outer leads 4b. Accordingly, it is possible to reduce the costs. Also, there is an advantage in that the number of processes, which may damage the package after the completion of the molding process, is reduced.

20 In accordance with the fabrication method according to the present invention, it is possible to use the fabrication process for LOC lead frames and the resin molding process associated therewith as they are or while partially eliminating them. Therefore, it is possible to
25 obtain a package having a more compact and thinner

structure while being equivalent in costs, as compared to conventional molded packages.

In the semiconductor package structure shown in Fig. 1, however, if the semiconductor chip 1 has a deviation in size, the mold may then damage a part of the semiconductor chip 1. This is because the package has the same size as the semiconductor chip 1 at its molding region. Such a problem can be eliminated by setting the molding region to have a size slightly larger than that of the semiconductor chip 1. Where the lead frame 4 is fabricated to have a size slightly larger than that of the semiconductor chip 1, and the mold is constructed to have a size corresponding to a region defined by the resin dam bars 17 defining the slightly increased size of the lead frame 4, the mold does not come into contact with the end surfaces 1c of the semiconductor chip 1 even when the semiconductor chip 1 has a deviation in size. Accordingly, it is possible to prevent the semiconductor chip 1 from being damaged. Although there is a gap G defined between each end surface 4d of the lead frame 4 and the associated end surface 1c of the semiconductor chip 1, this gap G is filled with the molding resin 11 during the formation of the resin encapsulate 8. Thus, the end surfaces 1c of the semiconductor chip 1 are protected by the mold resin 11 after the formation of the resin encapsulate 8.

Furthermore, in the semiconductor package structure shown in Figs. 1 and 3, if the lead frame is in a state insufficiently fixed in a thickness direction at its portion near the outer leads 4b by the double-sided adhesive tape 3 arranged at the inner lead region during the encapsulating process, the molding resin may spread in the form of a thin film on the surface 4c of the outer leads 4b. In this case, it is necessary to shave off the resin film coated on the surface 4c. The phenomenon of the molding resin spreading on the outer lead surface 4c can be effectively prevented by interposing a double-sided adhesive tape 13 having the same thickness as the double-sided adhesive tape 3 between the semiconductor chip and the outer leads 4b in the vicinity of the periphery of the package. A combination of the structures shown in Figs. 3 and 4 may also be used.

Although the silver plating film 7 is formed over the entire portion of the surface 4c of each outer lead 4b in the structure of Fig. 1, 3 or 4, this may inevitably result in an increase in costs because of an increase in the amount of silver used. However, the amount of silver used can be reduced by reducing the area coated with the silver plating film, as indicated by the reference numeral 14 in Fig. 5. In this case, there is an advantage in regard to costs. The reference numeral 15 denotes an area plated

with no silver plating film.

Fig. 6 illustrates an example in which a solder plating film 16 is formed on the surface 4c of each outer lead 4b. As described above, the formation of the solder plating film on the surface of the outer lead 4b inevitably involves an increase in the number of processes damaging the package. Of course, this is not avoided in the present invention.

In the above mentioned embodiment of the present invention, a semiconductor chip was used which has a thickness of 0.3 mm. The lead frame used has a thickness of 0.15 mm. Also, the double-sided adhesive tape has a total thickness of 0.05 mm. The inner leads were subjected to a coining process to have coining portions having a thickness of 0.075 mm. Although the coining process was used as a method for reducing the thickness of the inner leads, a half-etching process may be used. Although the double-sided adhesive tape was used as a means for attaching the semiconductor chip to the lead frame, an adhesive may be simply used.

[EFFECTS OF THE INVENTION]

In accordance with the present invention, a stepped lead structure is provided by a reduction in the thickness of each inner lead. Accordingly, it is unnecessary to give a machining depth exceeding the lead thickness. Such a machining depth is required in the conventional method in

which a stepped lead structure is provided in accordance with a down-setting process. Thus, it is possible to produce a semiconductor package having a reduced thickness. Since the lead frame has a size slightly larger than that of the semiconductor chip in accordance with the present invention, it is possible to effectively prevent the semiconductor chip from being damaged by the mold.

Moreover, it is possible to prevent the molding resin from spreading on the surfaces of the outer leads because the adhesive adapted to bond the lead frame to the surface of the semiconductor chip is also applied to the outer leads. Accordingly, it is unnecessary to shave off the outer lead surfaces.